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सड़क वाहन — द्रवित पेट्रोलियम गैस  
( एलपीजी ) विशेष उपकरण — गैस  
इंजैक्टर

Road Vehicles — Liquefied  
Petroleum Gas (LPG) Specific  
Equipment — Gas Injector

ICS 43.060.40

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भारतीय मानक ब्यूरो  
BUREAU OF INDIAN STANDARDS

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## FOREWORD

This Indian Standard was adopted by Bureau of Indian Standards, after the draft finalized by the Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee, had been approved by the Transport Engineering Division Council.

In the formulation of this standard, considerable assistance has been derived from United Nations Regulation No. 67 (Revision 2 – Amendment 3 : Supplement 9 to the 01 series of amendments: Date of entry into force: 19 August 2010), ‘Uniform provisions concerning: Part 1 — Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system’.

Following Rules and Acts may be referred to for latest update on statutory requirements related to use of LPG fuel system in internal combustion engine vehicles:

- a) *Central Motor Vehicle Rules*, 1989 (CMVR) (as amended from time-to-time); and
- b) *Motor Vehicle Act*, 1988 (MVA) (as amended from time-to-time).

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*).’ The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# ROAD VEHICLES — LIQUEFIED PETROLEUM GAS (LPG) SPECIFIC EQUIPMENT — GAS INJECTOR

### 1 SCOPE

**1.1** This standard specifies definitions, general design requirements, performance and test methods of gas injector of LPG specific equipment of motor vehicles of category L, M and N as defined in IS 14272 : 2011 'Automotive vehicles — Types — Terminology using LPG in their propulsion system'.

**1.2** This standard is applicable to LPG specific equipment intended to use on vehicles using liquefied petroleum gas (LPG) in accordance with Central Motor Vehicle Rules.

**1.3** This standard is not applicable to the LPG specific equipment used in agricultural tractors and construction equipment vehicles.

### 2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

| <i>IS No.</i> | <i>Title</i>                                                                                                            |
|---------------|-------------------------------------------------------------------------------------------------------------------------|
| 15956 : 2012  | Road vehicles — Liquefied Petroleum Gas (LPG) specific equipment — Definitions, Classification and general requirements |
| 15957 : 2012  | Road vehicles — Liquefied Petroleum Gas (LPG) specific equipment — General design rules, performance and test methods   |

### 3 DEFINITIONS

For the purpose of this standard, definitions given in IS 15956 shall apply.

### 4 CLASSIFICATIONS OF COMPONENTS

The gas injector is classified in accordance with IS 15956 according to the maximum operating pressure during operation.

### 5 DESIGN TEMPERATURES

The gas injector shall be designed for temperature of

–20°C to 120°C, when the fuel pump, if provided, is mounted outside the container.

### 6 GENERAL DESIGN REQUIREMENTS

Following requirements of IS 15957, as relevant, shall be applicable.

- a) Provisions regarding the electrical insulation (*see 4.1* of IS 15957);
- b) Provisions regarding the insulation class (*see 4.1.1* of IS 15957);
- c) Provisions when the power is switched off (*see 4.2* of IS 15957); and
- d) Heat exchange medium (compatibility and pressure requirements) (*see 4.3.1* of IS 15957).

### 7 TESTS AND TEST PROCEDURES

**7.1** Applicable tests and test procedures for type approval are given in Table 1.

**Table 1 Tests and Test Procedure**  
(Clause 7.1)

| Sl<br>No. | Test                   | Procedure (Clause<br>of IS 15957) |
|-----------|------------------------|-----------------------------------|
| (1)       | (2)                    | (3)                               |
| i)        | Over pressure test     | 7                                 |
| ii)       | External leakage       | 8                                 |
| iii)      | High temperature       | 9                                 |
| iv)       | Low temperature        | 10                                |
| v)        | LPG compatibility      | 14 <sup>1)</sup>                  |
| vi)       | Corrosion resistance   | 15 <sup>2)</sup>                  |
| vii)      | Resistance to dry heat | 16 <sup>1)</sup>                  |
| viii)     | Ozone ageing           | 17 <sup>1)</sup>                  |
| ix)       | Creep                  | 18 <sup>1)</sup>                  |
| x)        | Temperature cycle      | 19 <sup>1)</sup>                  |

<sup>1)</sup> Only for non-metallic parts.  
<sup>2)</sup> Only for metallic parts.

### 7.2 Number of Samples for Testing

Number of samples to be selected for type approval is given in Table 2.

### 8 MARKING

**8.1** Each gas injector shall be permanently and legibly marked with the following information:

**Table 2 Sample Size for Type Approval**  
(Clause 7.2)

| Sl No. | Test Description              | Sample     |   |   |   |   |   |   |                                              |   |   |
|--------|-------------------------------|------------|---|---|---|---|---|---|----------------------------------------------|---|---|
|        |                               | Assemblies |   |   |   |   |   |   | Non-metallic Parts (3 numbers for each test) |   |   |
|        |                               | 1          | 2 | 3 | 4 | 5 | 6 | 7 |                                              |   |   |
| i)     | Over pressure test            | X          |   |   |   |   |   |   |                                              |   |   |
| ii)    | External leakage test         |            | X |   |   |   |   |   |                                              |   |   |
| iii)   | High temperature leakage test |            |   | X |   |   |   |   |                                              |   |   |
| iv)    | Low temperature leakage test  |            |   |   | X |   |   |   |                                              |   |   |
| v)     | Corrosion test                |            |   |   |   | X |   |   |                                              |   |   |
| vi)    | Temperature cyclic test       |            |   |   |   |   | X |   |                                              |   |   |
| vii)   | Creep test                    |            |   |   |   |   |   | X |                                              |   |   |
| viii)  | Ozone ageing test             |            |   |   |   |   |   |   | X                                            |   |   |
| ix)    | Resistance to dry heat        |            |   |   |   |   |   |   |                                              | X |   |
| x)     | LPG compatibility             |            |   |   |   |   |   |   |                                              |   | X |

- a) Manufacturers name, trade-mark, if any;
- b) Maximum regulated pressure or class; and
- c) Part No. /Unique identification mark/Type No./Model No.

- g) Drawings with relevant dimensions and material.

#### **10 ACCEPTANCE TEST (CONFORMITY OF PRODUCTION)**

For the purpose of acceptance test, LPG gas injector shall conform to the following tests (*see 7.1*):

- a) Overpressure test;
- b) External leakage test; and
- c) LPG compatibility test (for non-metallic parts).

#### **11 CHANGES IN TECHNICAL SPECIFICATIONS OF A TYPE APPROVED COMPONENT AND EXTENSION OF APPROVAL**

**11.1** Any functional modification in technical specification declared in accordance with **9** shall be intimated to the test agency.

**11.2** Testing agency may then consider, whether,

- a) The component with modification complies with specified requirements, or
- b) Any further test/verification is required.

In case of (b), checks need to be carried out only for those parameters which are affected by the modifications. For deciding whether any further verification/test is required in case of (b), guidelines given in Table 3 shall be followed.

### **8.2 BIS Certification Marking**

**8.2.1** Each gas injector may also be marked with the BIS Standard Mark.

**8.2.2** The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufactures or producers may be obtained from the Bureau of Indian Standards.

### **9 TECHNICAL INFORMATION TO BE SUBMITTED BY THE COMPONENT MANUFACTURER**

Technical information to be submitted by the component manufacturer for component type test (type approval) shall contain at least the following:

- a) Name of the manufacturer;
- b) Manufacturing plant address;
- c) Class;
- d) Part No./Unique identification mark/Type No./Model No.;
- e) Maximum operating pressure;
- f) Operating temperature range; and

**Table 3 Verification/Test Required**  
(Clauses 11.2 and 11.3)

| SI No. | Parameter/Criteria                                       | Whether Verification is Required                                          |
|--------|----------------------------------------------------------|---------------------------------------------------------------------------|
| (1)    | (2)                                                      | (3)                                                                       |
| i)     | Change in material from metallic to non-metallic parts   | Tests related to non-metallic parts only needs to be carried out          |
| ii)    | Increase in working pressure within the same class       | Overpressure and external leakage tests are required                      |
| iii)   | Decrease in working pressure                             | No test is required                                                       |
| iv)    | Change in operating temperature range                    | No test is required if the change is within the range specified for tests |
| v)     | Addition of parts to change direction of outlet or inlet | No verification is required                                               |

In the event of (a) or in the case of (b), after successful compliance to requirements, the certificate of compliance shall be validated for the modified version.

**11.3** For any change in parameters other than mentioned in **9** and those covered in Table 3, no re-type approval is required.

## ANNEX A

### (Foreword)

#### COMMITTEE COMPOSITION

##### Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee, TED 26

| <i>Organization</i>                                         | <i>Representative(s)</i>                                                 |
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